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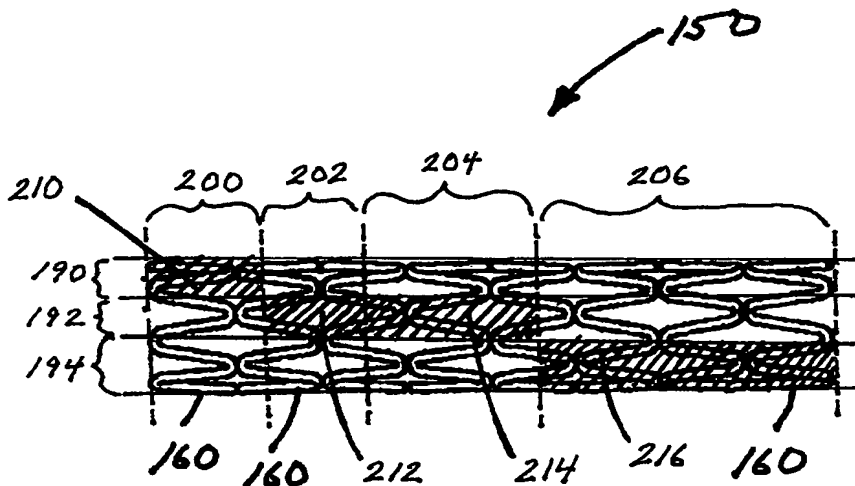
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(54) Title: STENT WITH INTERMITTENT COATING



(57) Abstract: The stent with an intermittent coating of the present invention provides a coating having a plurality of discrete coating sections disposed on a stent, i.e., an intermittent coating. The individual coating sections can contain different drugs or therapeutic agents, can be made of different polymers, can be made with different solvents, or combinations thereof. The coating sections can be applied in patterns such as ring patterns, striped patterns, spotted patterns, or dot matrix patterns. In one embodiment, the regions can be large relative to the stent, such as a ring pattern including one therapeutic agent in the radial regions at the ends of a stent and a different therapeutic agent in the radial region in the middle. In another embodiment, the regions can be small relative to the stent, such as a dot matrix pattern with each grid region being a small point.

AMENDED CLAIMS

**[Received by the International Bureau on 23 April 2004 (23.04.2004);
original claims 1-25 replaced by amended claims 1-25 (4 pages)]**

1. A stent delivery system comprising:
a catheter;
a balloon operably attached to the catheter; and
a stent disposed on the balloon, the stent having a first region and a second region;
a first coating section, the first coating section disposed on the first region; and
a second coating section, the second coating section disposed on the second region;
wherein the first region and the second region are discrete.
2. The stent delivery system of claim 1 wherein the first coating section comprises a first polymer and the second coating section comprises a second polymer.
3. The stent delivery system of claim 2 wherein the first coating section includes a first therapeutic agent and the second coating section includes a second therapeutic agent.
4. The stent delivery system of claim 1 wherein the first coating section includes a therapeutic agent.
5. The stent delivery system of claim 1 wherein the first region and the second region form a pattern selected from the group consisting of ring patterns, striped patterns, spotted patterns, and dot matrix patterns.
6. A coated stent comprising:
a stent, the stent having a first region and a second region;
a first coating section, the first coating section disposed on the first region; and
a second coating section, the second coating section disposed on the second region;
wherein the first region and the second region are discrete.
7. The coated stent of claim 6 wherein the first coating section comprises a first polymer and the second coating section comprises a second polymer.

8. The coated stent of claim 7 wherein the first coating section includes a first therapeutic agent and the second coating section includes a second therapeutic agent
9. The coated stent of claim 6 wherein the first coating section includes a therapeutic agent.
10. The coated stent of claim 6 wherein the first region and the second region form a pattern selected from the group consisting of ring patterns, striped patterns, spotted patterns, and dot matrix patterns.
11. A method for producing a coated stent comprising:
providing a stent, the stent having a first region and a second region;
mixing a first polymer and first therapeutic agent with a first solvent to form a first polymer solution;
applying the first polymer solution to the first region to form a first coating section;
mixing a second polymer and second therapeutic agent with a second solvent to form a second polymer solution; and
applying the second polymer solution to the second region to form a second coating section.
12. The method of claim 11 wherein applying the first polymer solution and applying the second polymer solution further comprises applying the first polymer solution and applying the second polymer solution simultaneously.
13. The method of claim 11 further comprising curing the first polymer solution and curing the second polymer solution.
14. The method of claim 11 wherein applying the first polymer solution to the first region further comprises:
mounting the stent in a coating fixture; and
spraying the first polymer solution on the first region.

15. The method of claim 14 wherein the coating fixture is a computerized numerically controlled machine.

16. The method of claim 14 wherein spraying the first polymer solution on the first region further comprises spraying the first polymer solution by a spraying method selected from the group consisting of micro-spraying and inkjet spraying.

17. The method of claim 11 wherein applying the first polymer solution to the first region further comprises applying the first polymer solution by an application method selected from the group consisting of pad printing, inkjet printing, rolling, painting, spraying, micro-spraying, dipping, wiping, electrostatic deposition, vapor deposition, epitaxial growth, and combinations thereof.

18. A system for producing a coated stent comprising:
means for providing a stent, the stent having a first region and a second region;
means for mixing a first polymer and first therapeutic agent with a first solvent to form a first polymer solution;
means for applying the first polymer solution to the first region to form a first coating section; and
means for mixing a second polymer and second therapeutic agent with a second solvent to form a second polymer solution; and
means for applying the second polymer solution to the second region to form a second coating section.

19. The system of claim 18 wherein means for applying the first polymer solution and means for applying the second polymer solution further comprises means for applying the first polymer solution and the second polymer solution simultaneously.

20. The system of claim 18 further comprising means for curing the first polymer solution and means for curing the second polymer solution.

21. The system of claim 18 wherein means for applying the first polymer solution to the first region further comprises:
- means for mounting the stent in a coating fixture; and
 - means for spraying the first polymer solution on the first region.
22. A coated stent comprising:
- a stent, the stent having a discrete first region and a discrete second region;
 - a first polymer including a first therapeutic agent, the first polymer disposed on the discrete first region; and
 - a second polymer including a second therapeutic agent, the second polymer disposed on the discrete second region.
23. The coated stent of claim 22 wherein the discrete first region and the discrete second region are separated by a bare section.
24. The coated stent of claim 23 wherein the bare section extending between the discrete first region and the discrete second region for a distance of approximately 1 millimeter (0.03937 inches)
25. The coated stent of claim 24 wherein the bare section extending between the discrete first region and the discrete second region for a distance of approximately 0.025 millimeter (0.00098 inches).

Atty Docket No. P1187 PCT

CLAIMS

1. A stent delivery system comprising:
a catheter;
a balloon operably attached to the catheter; and
a stent disposed on the balloon, the stent having a first region and a second region;
a first coating section, the first coating section disposed on the first region; and
a second coating section, the second coating section disposed on the second region;
wherein the first region and the second region are discrete.
2. The stent delivery system of claim 1 wherein the first coating section comprises a first polymer and the second coating section comprises a second polymer.
3. The stent delivery system of claim 2 wherein the first coating section includes a first therapeutic agent and the second coating section includes a second therapeutic agent.
4. The stent delivery system of claim 1 wherein the first coating section includes a therapeutic agent.
5. The stent delivery system of claim 1 wherein the first region and the second region form a pattern selected from the group consisting of ring patterns, striped patterns, spotted patterns, and dot matrix patterns.
6. A coated stent comprising:
a stent, the stent having a first region and a second region;
a first coating section, the first coating section disposed on the first region; and
a second coating section, the second coating section disposed on the second region;
wherein the first region and the second region are discrete.
7. The coated stent of claim 6 wherein the first coating section comprises a first polymer and the second coating section comprises a second polymer.

Atty Docket No. P1187 PCT

8. The coated stent of claim 7 wherein the first coating section includes a first therapeutic agent and the second coating section includes a second therapeutic agent
9. The coated stent of claim 6 wherein the first coating section includes a therapeutic agent.
10. The coated stent of claim 6 wherein the first region and the second region form a pattern selected from the group consisting of ring patterns, striped patterns, spotted patterns, and dot matrix patterns.
11. A method for producing a coated stent comprising:
 - providing a stent, the stent having a first region and a second region;
 - mixing a first polymer and first therapeutic agent with a first solvent to form a first polymer solution;
 - applying the first polymer solution to the first region to form a first coating section;
 - mixing a second polymer and second therapeutic agent with a second solvent to form a second polymer solution; and
 - applying the second polymer solution to the second region to form a second coating section.
12. The method of claim 11 wherein applying the first polymer solution and applying the second polymer solution further comprises applying the first polymer solution and applying the second polymer solution simultaneously.
13. The method of claim 11 further comprising curing the first polymer solution and curing the second polymer solution.
14. The method of claim 11 wherein applying the first polymer solution to the first region further comprises:
 - mounting the stent in a coating fixture; and
 - spraying the first polymer solution on the first region.

ART 34 AMDT

AMENDED SHEET (ARTICLE 19)

23/04 '04 VEN 22:48 [TX/RX N°

22-07-2004

Atty Docket No. P1187 PCT

15. The method of claim 14 wherein the coating fixture is a computerized numerically controlled machine.
16. The method of claim 14 wherein spraying the first polymer solution on the first region further comprises spraying the first polymer solution by a spraying method selected from the group consisting of micro-spraying and inkjet spraying.
17. The method of claim 11 wherein applying the first polymer solution to the first region further comprises applying the first polymer solution by an application method selected from the group consisting of pad printing, inkjet printing, rolling, painting, spraying, micro-spraying, dipping, wiping, electrostatic deposition, vapor deposition, epitaxial growth, and combinations thereof.
18. A system for producing a coated stent comprising:
means for providing a stent, the stent having a first region and a second region;
means for mixing a first polymer and first therapeutic agent with a first solvent to form a first polymer solution;
means for applying the first polymer solution to the first region to form a first coating section; and
means for mixing a second polymer and second therapeutic agent with a second solvent to form a second polymer solution; and
means for applying the second polymer solution to the second region to form a second coating section.
19. The system of claim 18 wherein means for applying the first polymer solution and means for applying the second polymer solution further comprises means for applying the first polymer solution and the second polymer solution simultaneously.
20. The system of claim 18 further comprising means for curing the first polymer solution and means for curing the second polymer solution.

ART 34 AMEND

AMENDED SHEET (ARTICLE 19)

23/04 '04 VEN 22:48 [TX/RX N° 22-07-2004]

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21. The system of claim 18 wherein means for applying the first polymer solution to the first region further comprises:
- means for mounting the stent in a coating fixture; and
 - means for spraying the first polymer solution on the first region.
22. A coated stent comprising:
- a stent, the stent having a discrete first region and a discrete second region;
 - a first polymer including a first therapeutic agent, the first polymer disposed on the discrete first region; and
 - a second polymer including a second therapeutic agent, the second polymer disposed on the discrete second region.
23. The coated stent of claim 22 wherein the discrete first region and the discrete second region are separated by a bare section.
24. The coated stent of claim 23 wherein the bare section extending between the discrete first region and the discrete second region for a distance of approximately 1 millimeter (0.03937 inches)
25. The coated stent of claim 24 wherein the bare section extending between the discrete first region and the discrete second region for a distance of approximately 0.025 millimeter (0.00098 inches).

AMENDED SHEET (ARTICLE 9)

INTERNATIONAL SEARCH REPORT

Rec'd PCT/PTO 18 APR 2005

Int'l Application No
PCT/03/32441

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 B05D1/00 A61F2/06 A61L31/10 A61L31/16 A61L27/14

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 B05D A61F A61L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ, EMBASE, BIOSIS

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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X	US 2002/051730 A1 (BODNAR STANKO ET AL) 2 May 2002 (2002-05-02) figures 23-26 paragraphs '0028!', '0029!', '0061!', '0063!', '0077!', '0078!', '0094!', '0099!	1-23
Y	paragraphs '0124!-'0126! paragraphs '0131!', '0168!	24, 25
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☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
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INTERNATIONAL SEARCH REPORT

Int. Application No
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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

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